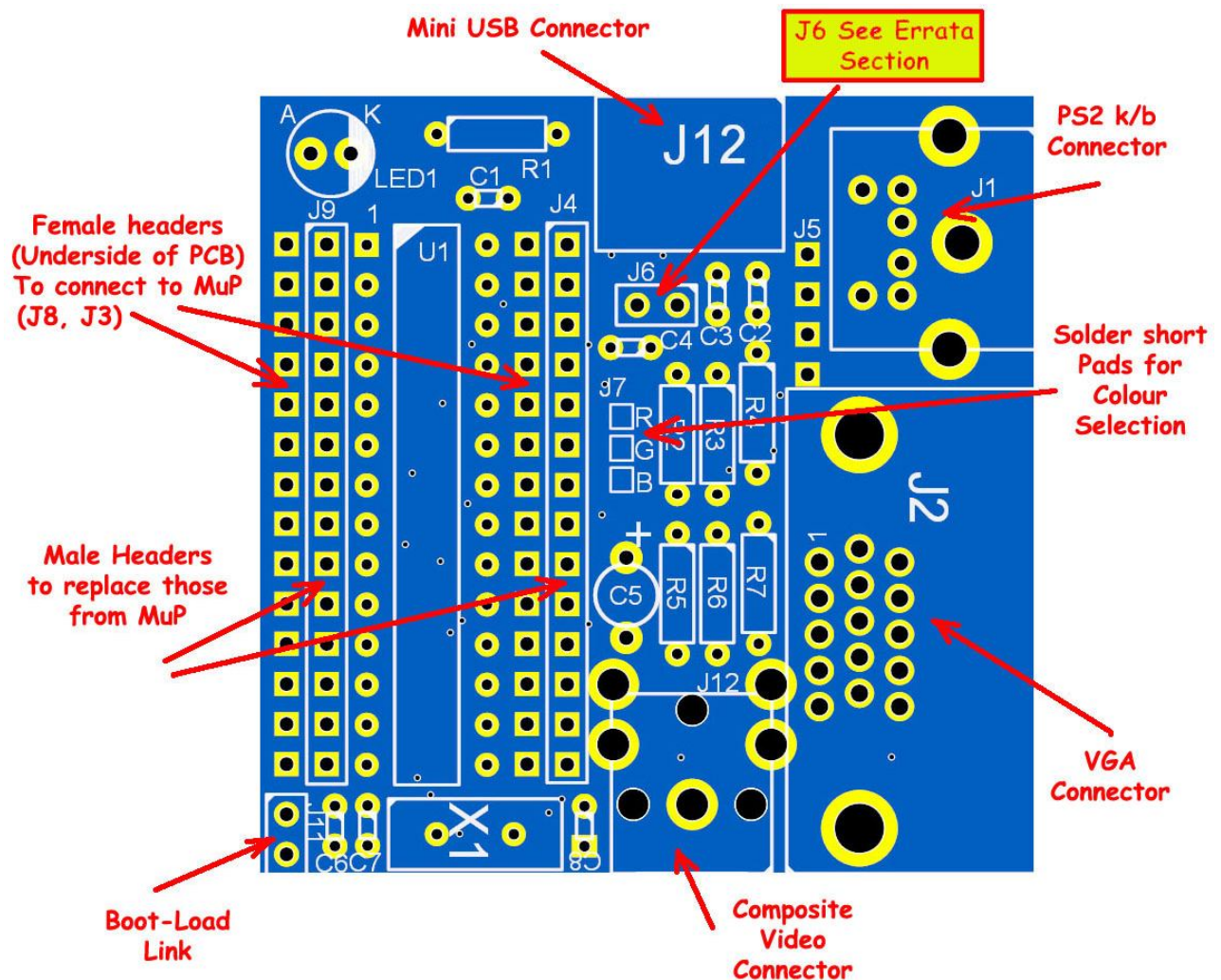
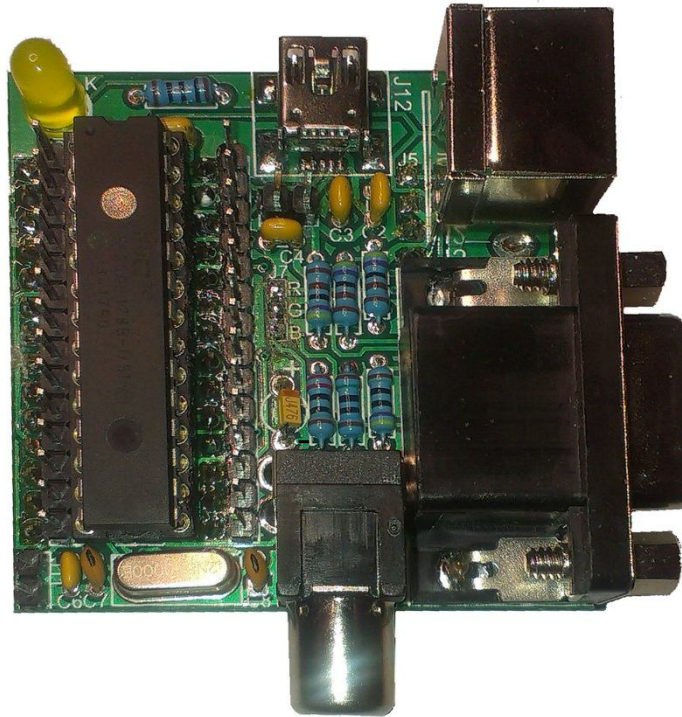


MuP-VT



Board Concept.

MuP-VT is a small 49.5mm x 49.5mm PCB that is based on Geoff Graham's ASCII Video Terminal (AVT), which is a VT100 based terminal PCB based on a PI C32MX250F128B microprocessor. The AVT can communicate via a USB cable to a PC and appears to the PC as a serial port.

Full hardware design for the ASCII Video Terminal project can be found here:

<http://geoffg.net/terminal.html>

MuP-VT is designed to plug into MuP and, indeed, will not function without it as power is sourced from the 3v3 regulator that is catered for on MuP.

MuP-VT connects to MuP via 3 female headers that are mounted on the underside of the PCB (J3, J5 & J8). 5v power is routed from the Mini USB connector, J12, transferred to MuP (via J5) and 3v3 is in turn is transferred back up J5 to MuP-VT.

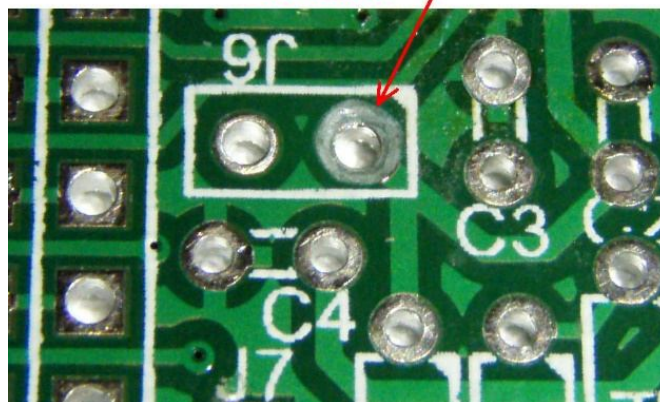
Important NOTE!

I had MuP-VT almost fully tracked when I decided as a last minute to add an isolation header (J6) to the 5V supply from the mini USB header so that, if desired, MuP-VT could be powered from an external power source whilst still connected to a PC. In theory it was a good idea but I mucked it up and inadvertently connected 5V to 3v3 if the header J6 was installed. ☹ Luckily the fix is fairly easy.

Step 1. (I will do this before I ship out any boards)

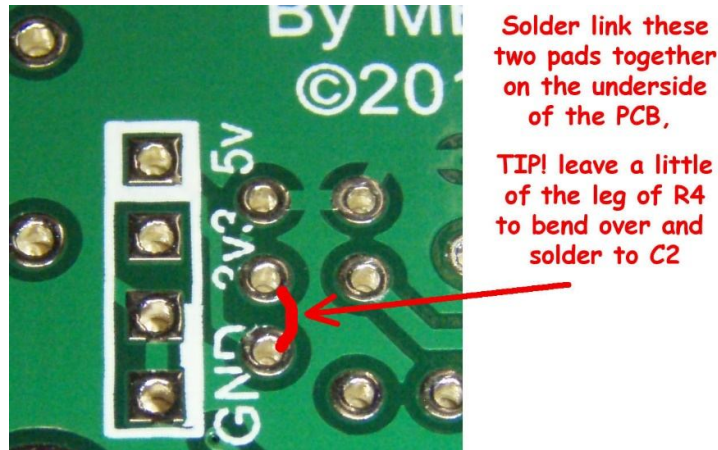
Using a drill fitted with a 4mm (3/16") drill bit, carefully drill out just the top pad from the right hand side of J6 as shown below:

Drill away the top Right hand pad of J6
As shown



Step 2.

Solder a short link between the bottom pad of C2 and the top pad of R4, this is best done on the bottom layer of the PCB and probably easiest if the top leg of R4 is trimmed leaving a short 3mm length that can be bent over and soldered to C2. The pads to be connected are shown in this picture of the underside of the board.



There is no need to install J6 as it will, in effect, do nothing. The reason I have drilled away the pad is, if at a later date, someone installs the J6 link no damage will be done to either Mup-VT or MuP. If at a later date I do another run of MuP-VT I will, of course, reinstate J6 with a corrected track layout.

Construction

MuP-VT looks easy to build and apart from the sole surface mount component (J12) is not too difficult to do. However there are a few 'gotchas' that can ruin your day if MuP-VT is not assembled in the correct order.

The following is my suggested order for assembling MuP-VT with minimal fuss.

J7 (top of the PCB)

These are 'solder short' pads for selecting the colour that the VGA monitor will display (Usually all 3 pad pairs will be solder shorted to select white text).

J10 (bottom of the board)

These are 'solder short' pads for selecting the baud-rate of the communication with the PC via the USB connection. (Usually these are left OPEN for software control.

My recommendation is to not link any of the pads of J10 as the baud-rate can be software selected from the configuration menu (Shift F12), MuP-VT will remember this setting for the next time it is powered up.

Configuration settings are shown in the table below:

BAUD RATE SELECT			
A	B	C	
●	●	●	115200
●	●	○	57600
●	○	●	38400
●	○	○	19200
○	●	●	9600
○	●	○	4800
○	○	●	2400
○	○	○	Configurable default 1200

Table reprinted

With kind permission

Of Geoff Graham

J12 (mini USB connector)

As the only surface mount component it is best to fit this part next. I would have liked to use a through hole part here but whilst through hole mini USB connectors are actually available they are not easy to find and are not particularly cheap.

Resistors, Capacitors, Led and X-Tal

Should be installed next, remember to leave a short length of the `top' leg of R4 to bend over to solder onto the bottom leg of C2 (see text in Step 2 above).

Headers J3, J4, J5, J8, J9 & J11, U1

Should be installed now, but be careful as due to the closeness of these headers/I C socket if they are not soldered in the order I recommend you will find it difficult to do without risking damage to the headers. The suggested order is as follows:

J4 (Male, Top of the board)

J3 (Female, Bottom of the board)

U1 (I C 28pin I C socket)

J9 (Male, Top of the board)

J8 (Female, Bottom of the board)

J11 (Male, Top of the board)

J5 (Female, Bottom of the board)

J1, J2 & J13 (RCA Socket incorrectly labelled as J12 on overlay)

Finally the larger connectors can be fitted. Take care that any metalwork/casing of the connectors do not touch any of the other components. Whilst the connectors I used are typical of most of the ones out there, there are some variations between manufacturers.

You are now ready to fit MuP-VT to MuP.

I find this is easiest by aligning the female header, J5, with the MuP's male header, J3, and then pressing the two boards together, making sure that the other two female headers, J3 & J8 mate correctly with MuP's male headers, J3 & J4.

Bill of Materials

Ref.	Type	Comments
C1	100nF	0.1" leg spacing
C2	100nF	0.1" leg spacing
C3	100nF	0.1" leg spacing
C4	100nF	0.1" leg spacing
C5	10uF	0.1" leg spacing
C6	100nF	0.1" leg spacing
C7	27pF	0.1" leg spacing
C8	27pF	0.1" leg spacing
J1	6pin Mini-Din	PS2 k/b socket
J2	R/A DB-15 Female	VGA socket (see below)
J3	14 Pin Female Header	Mounted on Underside
J4	14 Pin Male Header	
J5	4 Pin Female Header	Mounted on Underside
J6	Not Installed	** See text
J8	14 Pin Female Header	Mounted on Underside

VGA Socket example Element14/Farnell P/N 2401182

Ref.	Type	Comments
J9	14 Pin Male Header	
J11	2 pin Male header	
J12	Mini USB socket (SMD)	
J13	RCA R-A (see below)	
LED1	LED-Green	5mm
R1	82R	1/4 watt
R2	4k7	1/4 watt
R3	4k7	1/4 watt
R4	4k7	1/4 watt
R5	220R	1/4 watt
R6	150R	1/4 watt
R7	470R	1/4 watt
U1	PIC32MX250	
X1	8MHz XTAL	Low profile

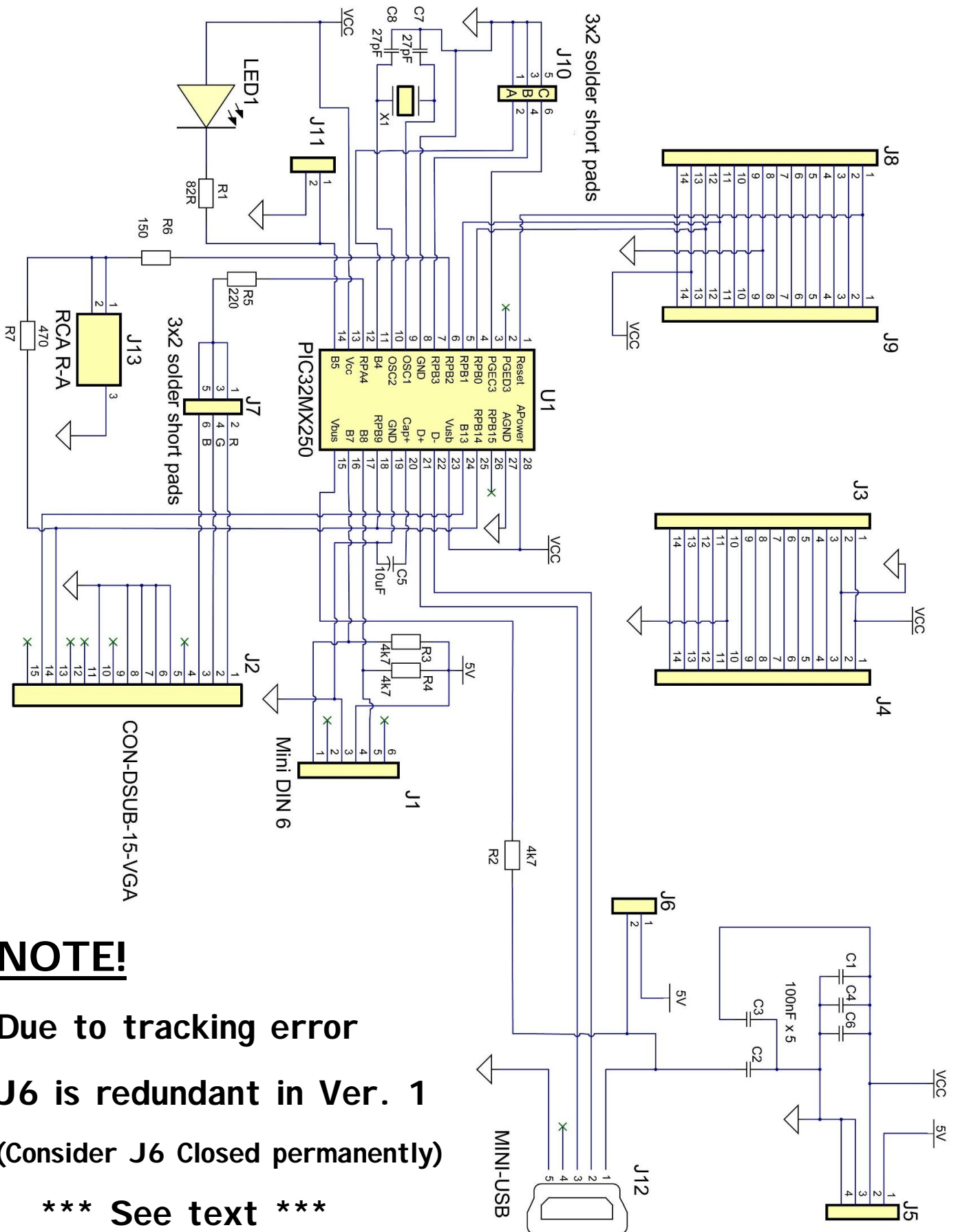
RCA Socket example

Element14/Farnell P/N 1280697

NOTE!

There are many different sizes and pin-outs styles for the VGA and RCA sockets, the items mentioned above will work, chose styles that are the same as those Element14/Farnell parts listed above.

Schematic



NOTE!

Due to tracking error
J6 is redundant in Ver. 1
(Consider J6 Closed permanently)

*** See text ***

ADDENDUM

J6 and 5V Power source

As mentioned earlier, the original intention of J6 was to allow MuP-VT (and MuP) to be powered from the USB socket (with J6 installed).

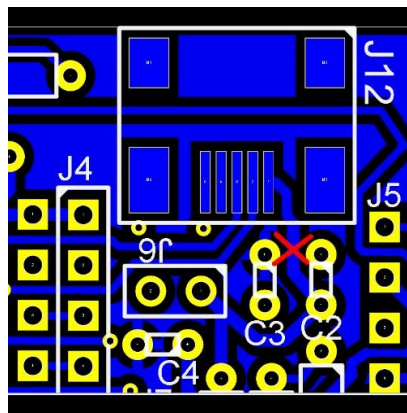
OR

Powered, via MuP, from an external 5v source (with J6 not installed).

Unfortunately, due to my stuff up, the `fix' means that the J6 link option will be `not there' so the only way to power MuP-VT (and MuP as well) is through the USB port. (either via a PC connection or a 5v USB `Wall-Wart' plug pack)

It is possible to power through an external supply, connected to MuP, **ONLY** if the USB is NOT also plugged in, or a track cut to remove power in on pin 1 of the USB connector. (Right hand side pin of J12 as the overlay is shown).

A picture of where to cut is shown below, however I really do not recommend this option. If I do a Ver. 2 MuP-VT, I will fix the functionality of J6.



J11 (Bootload)

The J11 jumper is the `bootload' link which has the same functionality as the `bootload' link on Geoff's original Ascii Video Terminal.

See: <http://geoffq.net/terminal.html>

For full details of the `bootload' link and the Ascii Video Terminal project.